

What is claimed is:

1. A dielectric coating for use on a conductive substrate comprising:

a silicone composition of the formula:

$[\text{RSiO}_{(4-x)/2}]_n$ wherein $x=1-4$ and wherein R comprises a compound selected from the group consisting of: methyl, phenyl, hydrido, hydroxyl, alkoxy groups or a combination of the above or monovalent radicals independently selected from alkyl, aryl, alylamide, arylamide, alkylamino groups and arylamino radicals (when $1 < x < 4$);

said dielectric coating having a network structure.

2. The dielectric coating of Claim 1 wherein the silicone composition comprises a silsesquioxane compound of the formula:

$[\text{RSiO}_{3/2}]_n$ wherein R comprises a compound selected from the group consisting of: methyl, phenyl, hydrido, hydroxyl, alkoxy or a combination of the above or monovalent radicals independently selected from alkyl, aryl, alylamide, arylamide, alkylamino groups and arylamino radicals (when $1 < x < 4$) (when $1 < x < 4$).

3. The dielectric coating of Claim 2 wherein the silsesquioxane compound further includes silanol units of the formula: $[\text{Rsi}(\text{OH})_x\text{O}_y]$ where $x+y=3$ and which can be silylated with appropriate organosiloxanes to produce corresponding silylated polysilsesquioxanes.

4. The dielectric coating of Claim 1 wherein the silicone composition comprises a polymethyl silsesquioxane of the formula:



5. The dielectric coating of Claim 1 wherein the silicone composition comprises a silsesquioxane copolymer of the formula:

$\text{R}^1_a\text{R}^2_b\text{R}^3_c\text{SiO}_{(4-a-b-c)/2}$, wherein: a is zero or a positive number, b is zero or a positive number, c is zero or a positive number, with the provisos that $0.8 \leq (a+b+c) \leq 3.0$ and wherein the copolymer has an average of at least 2 R^1 groups per molecule, and each R^1 is a functional group independently selected from the group consisting of hydrogen atoms and monovalent hydrocarbon groups having aliphatic unsaturation, and each R^2 and each R^3 are monovalent hydrocarbon groups independently selected from the group consisting of nonfunctional groups and R^1 .

6. The dielectric coating of Claim 5 wherein R^1 is an alkenyl group and R^2 and R^3 are nonfunctional groups selected from the group consisting of alkyl and aryl groups.

7. The dielectric coating of Claim 6 wherein R^1 is selected from the group consisting of vinyl and allyl groups.

8. The dielectric coating of Claim 6 wherein R^2 and R^3 are selected from the group consisting of methyl, ethyl, isopropyl, n-butyl, and isobutyl groups.

9. The dielectric coating of Claim 1 wherein the silicone composition comprises a phenyl-methyl siloxane compound of the formula:



10. A substrate structure comprising:

a conductive material;

a dielectric coating disposed on a surface of the conductive material

said dielectric coating comprising a silicone composition of the formula:

$[\text{RSiO}_{(4-x)/2}]_n$ wherein $x=1-4$ and wherein R comprises a compound selected from the group consisting of: methyl, phenyl, hydrido, hydroxyl, alkoxy groups or a combination of the above or monovalent radicals independently selected from alkyl, aryl, alylamide, arylamide, alkylamino groups and arylamino radicals (when $1 < x < 4$);

said dielectric coating having a network structure.

11. The substrate of Claim 10 wherein the silicone composition comprises a silsesquioxane compound of the formula:

$[\text{RSiO}_{3/2}]_n$ wherein R comprises a compound selected from the group consisting of: methyl, phenyl, hydrido, hydroxyl, alkoxy or a combination of the above or monovalent radicals independently selected from alkyl, aryl, alylamide, arylamide, alkylamino groups and arylamino radicals (when $1 < x < 4$) (when $1 < x < 4$).

12. The substrate of Claim 11 wherein the silsesquioxane compound further includes silanol units of the formula: $[\text{Rsi}(\text{OH})_x\text{O}_y]$ where $x+y=3$ and which can be silylated with appropriate organosiloxanes to produce corresponding silylated polysilsesquioxanes.

13. The substrate of Claim 10 wherein the silicone composition comprises a polymethyl silsesquioxane of the formula:



14. The substrate of Claim 10 wherein the silicone composition comprises a silsesquioxane copolymer of the formula:

$\text{R}^1_a\text{R}^2_b\text{R}^3_c\text{SiO}_{(4-a-b-c)/2}$, wherein: a is zero or a positive number, b is zero or a positive number, c is zero or a positive number, with the provisos that $0.8 \leq (a+b+c) \leq 3.0$ and wherein the copolymer has an average of at least 2 R^1 groups per molecule, and each R^1 is a functional group independently selected from the group consisting of hydrogen atoms and monovalent hydrocarbon groups having aliphatic unsaturation, and each R^2 and each R^3 are monovalent hydrocarbon groups independently selected from the group consisting of nonfunctional groups and R^1 .

15. The substrate of Claim 14 wherein R^1 is an alkenyl group and R^2 and R^3 are nonfunctional groups selected from the group consisting of alkyl and aryl groups.

16. The substrate of Claim 15 wherein R^1 is selected from the group consisting of vinyl and allyl groups.

17. The substrate of Claim 15 wherein R^2 and R^3 are selected from the group consisting of methyl, ethyl, isopropyl, n-butyl, and isobutyl groups.

18. The substrate of Claim 1 wherein the silicone composition comprises a phenyl-methyl siloxane compound of the formula:

